Appendix B of the Area-Wide HHRA and ERA

Initial list (based on historical investigations) starts with:

21 Metals - aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, uranium, vanadium, zinc

For sediment, surface water, and soil the following selection process occurred:

First screen – compares maximum detect to 2x Western U.S. mean background
Second screen – compares maximum detect to 2x area specific background
Third screen – compares with relevant risk benchmarks (e.g., AWQC, PRGs, etc.)

The following came through the screening:

For Human Health – arsenic, cadmium, chromium, selenium
For Ecological – cadmium, chromium, copper, nickel, selenium, vanadium, zinc

Note – some additional metals were carried forward for other media. For example, aluminum, antimony, arsenic, cadmium, chromium, cobalt, nickel, selenium, vanadium, and zinc were evaluated as COPC in terrestrial vegetation because each was 2x the average plant background levels.

Proposed Approach

Start with a reasonable list that is based on past regional studies related to phosphate mining. Area-Wide Risk Assessment considered historical studies and started with 21 metals and the USGS study identified 14 metals that are commonly elevated in waste-shale. Therefore, it would be reasonable to start (as Mike Rowe did) with the 14 plus uranium. These should all be considered in the risk assessment, however not all necessarily require additional data.

The risk assessment should initially screen maximum concentrations for the 15 above metals with risk-based benchmarks (EcoSSLs, EPA/ORNL's new Regional Human Health screening levels, ORNL Eco Benchmarks, etc.). If concentrations exceed they will be carried forward for further risk evaluation. Note: background data are not to be used to screen out COPCs.

The decision on whether additional data are needed can consider whether site data would indicate levels detected are within background (if data are available). That is, additional data may not be necessary, however the metal will need to be evaluated in the risk assessment.

If a metal is a COPC in soil, then it should also be considered a COPC in vegetation. Again, additional veg data may not be necessary for all, as these can be modeled.